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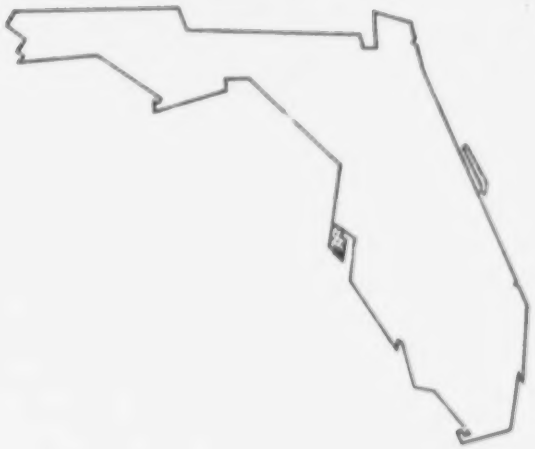
FLOOD INSURANCE STUDY



CITY OF PINELLAS PARK, FLORIDA
PINELLAS COUNTY

REVISED

FEBRUARY 17, 1989

Federal Emergency Management Agency

COMMUNITY NUMBER-120251

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

This publication incorporates revisions to the original Flood Insurance Study. These revisions are presented in Section 9.0.

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1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study report has been prepared to revise and update a previous Flood Insurance Study for the City of Pinellas Park, Pinellas County, Florida, which was published on August 15, 1977. This information will be used by Pinellas Park to update existing flood plain regulations as part of the regular program of flood insurance by the Federal Emergency Management Agency. The information will also be used by local and regional planners to further promote sound land use and flood plain development.

1.2 Coordination

The following organizations were contacted for coordination in the development of this study:

City of Pinellas Park
Florida State Department of Community Affairs
Florida State Department of Transportation
National Oceanic and Atmospheric Administration
Pinellas County
Pinellas County Planning Council
Pinellas Park Water Management District
Pinellas Suncoast Chamber of Commerce
Seaboard Coast Line Railroad
U.S. Army Corps of Engineers, Jacksonville District
U.S. Geological Survey
U.S. Soil Conservation Service
Southwest Florida Water Management District
Tampa Bay Regional Planning Council

The State Coordinator was involved with this study through the Atlanta Regional office of the Federal Emergency Management Agency.

An intermediate meeting was held in Pinellas Park on August 23, 1979. The meeting was attended by representatives of the City of Pinellas Park, the Federal Emergency Management Agency, and the study contractor. The purpose of the meeting was to inform the community of the progress of the study contractor and to deliver copies of the draft report.

The results of this study were reviewed at a final community coordination meeting held on July 22, 1980. Attending the meeting were representatives of the Federal Emergency Management Agency, study contractor, and the city. No problems were raised at the meeting.

1.3 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

The hydrologic and hydraulic analyses for this study were performed by Tetra Tech, Inc., for the Federal Emergency Management Agency, under Contract No. H-4510. This work, which was completed in June 1979, covered all significant flooding sources affecting the City of Pinellas Park, Florida.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated areas of the City of Pinellas Park, Pinellas County, Florida. The area of study is shown on the Vicinity Map (Figure 1).

The entire City of Pinellas Park was studied in detail because of its complete development. Study analysis includes the effects of hurricane surge and stormwater runoff. The flooding sources affecting the community are Boca Ciega Bay, Tampa Bay, and Ditches 1, 1A, 2, 2A, 3, 4, and 5.

Those areas studied by detailed methods were chosen with consideration given to all proposed construction and forecasted development through 1984.

2.2 Community Description

The City of Pinellas Park is in south-central Pinellas County, in west-central Florida. The community occupies an area of approximately 10.6 square miles. The city is located approximately 250 miles northwest of Miami, approximately 220 miles southwest of Jacksonville, and approximately 250 miles southeast of Tallahasee. Tampa Bay is 6 miles to the east of the city, and Boca Ciega Bay is 6 miles to the southwest. The study area is bounded on the north by the City of Largo and unincorporated areas of Pinellas County, on the east by the City of St. Petersburg and unincorporated areas of Pinellas County, and on the south and west by unincorporated areas of Pinellas County.

The Cross Bayou Canal runs northeast-southwest across the northwestern tip of the city and just past the western corporate limits.

The U.S. Bureau of the Census recorded the 1970 population of Pinellas Park at 22,287, a 105 percent increase over the 1960 census of 10,848. The 1978 permanent population was estimated to be 32,530, which represented an increase of approximately 46 percent over the 1970 figures (References 1 and 2).

Pinellas Park was incorporated as a city in 1915. Today it is primarily an urban area with approximately 60 percent residental and 40 percent commercial development (Reference 3). The manufacture

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF PINELLAS PARK, FL

(PINELLAS CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

of electronic components, cabinets, tools, and plastic products contributes to the economy of the city.

Pinellas Park has a subtropical climate characterized by mild, dry winters and warm, wet summers. The wet season extends from June through September and coincides with the hurricane season. During this 4-month period, the study area receives nearly two-thirds of its annual precipitation. The average annual precipitation is 54.6 inches, and the average annual temperature is 73.5°F (Reference 4).

The Pinellas Park region is one of the lowest in Pinellas County and is characterized as being generally flat, poorly drained, and containing several low-lying depressions.

Elevations in the city range from sea level to 20 feet. Approximately 25 percent of the land area is impervious (streets, parking lots, and roofs), and most streets have swale drainage. The city drainage consists of two major systems which were constructed and are maintained by the city. The system that drains west to Cross Bayou Canal consists of three ditches (Ditches 1, 4, and 5) and their tributaries. Two more ditches (Ditches 2 and 3) and their tributaries drain the storm water east to Sawgrass Lake and then to Tampa Bay.

The study area is characterized by an urban landscape, with sandy soils that are poorly drained to moderately well drained. The vegetation is typical of urban land in a subtropical climatic zone.

2.3 Principal Flood Problems

Flooding in Pinellas Park results primarily from stormwater runoff and coastal surge from Tampa Bay and Boca Ciega Bay. Because of the relative flatness of the terrain, lower areas of the city adjacent to drainage ditches are subject to shallow flooding. This occurs from heavy rainfalls during thunderstorm activity in the summer and as a result of additional rainfall and coastal surge from the passage of hurricanes. The area of the city west of U.S. Highway 19 is affected by coastal surge from Boca Ciega Bay, whereas, the area east of U.S. Highway 19 is affected by coastal surge from Tampa Bay.

Storms passing in the vicinity of Pinellas Park have periodically produced damaging floods in the area. During the storm of June 27, 1974, widespread inundation occurred in the study area. Record rainfall amounts of more than 22 inches were recorded over a 4-day period. Many structures were inundated to depths of 1 to 3 feet for 1 or more days (Reference 3).

Hurricane tides with a recurrence interval of 100 years or less are not expected to directly affect flooding in most of the study area since the majority of Pinellas Park has an elevation of more than 10 feet. Hurricane tides having recurrence intervals greater than 100 years will affect areas of eastern and western Pinellas Park. The maximum tide of record, 14.3 feet, observed at the present site of the St. Petersburg Municipal pier in 1848, probably could have inundated some inland areas and impeded storm drainage from the area.

2.4 Flood Protection Measures

Existing flood protection measures consist chiefly of the surface drainage system.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a special magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual occurrence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were performed for both tidal and riverine flooding in the community.

The determination of inundation from Tampa Bay and Boca Ciega Bay caused by passage of a hurricane surge was approached by the joint probability method (Reference 5). The storm populations were described by probability distributions of five parameters

which influence surge heights. These were central pressure depression (which measures the intensity of the storm), radius to maximum winds, forward speed of the storm, shoreline crossing point, and crossing angle. These characteristics were described statistically based upon an analysis of observed storms in the vicinity of Pinellas County. Primary sources of data for this were the National Climatic Center (Reference 6); Cry (Reference 7); Ho, Schwerdt, and Goodyear (Reference 8); the National Hurricane Research Project (Reference 9); and the Monthly Weather Review (Reference 10). Digitized storm information for all storms from 1886 to 1977 was used to correlate statistics (Reference 11). A summary of the parameters used for the Pinellas County area is presented in Table 1.

The determination of peak discharges for the floods of the selected recurrence intervals for all ditches was adopted from the 1977 Flood Insurance Study prepared by the U.S. Geological Survey (Reference 3). In that study, station-frequency curves under natural conditions were developed for 9 streams (within the immediate area of Pinellas Park), with periods of station records (Table 2) available for 20 to 34 years, using observed peak discharges and the log-Pearson Type III method (Reference 12). The station-frequency curves were extrapolated to include the 500-year flood.

Regional flood-frequency curves under natural conditions were developed for the 10-, 50-, 100-, and 500-year floods by plotting recurrence interval flood-peak discharges (obtained from the station frequency curves), versus drainage area. These curves were interpolated to include areas as small as 0.5 square mile.

Regional flood-frequency curves under urban conditions were developed from the natural curves by the application of urban adjustment factors (References 13 and 14). These factors account for the increase in peak discharges due to paving of urbanized areas. Urban adjustment factors used for Pinellas Park are listed below.

Percent Impervious Area	Recurrence Interval (Years) 10	50	100	500
25	1.9	1.7	1.6	1.4

Adjustment factors are not available for flood-peak discharges having recurrence intervals greater than 100-years. Therefore, the adjustment factor shown for the 500-year recurrence interval was estimated from an extrapolation of a log-normal probability plot of data shown for the 10-, 50-, and 100-year recurrence intervals.

Peak discharge-drainage area relationships for all ditches are shown in Table 3.

Table 1. Parameter Values for Surge Elevation, Pinellas County, Florida

Central Pressure Depression (mb)		85	75	65	55	45	35	25	15	5
Probabilities:	Entering	0.02	0.02	0.03	0.04	0.05	0.09	0.25	0.25	0.25
	Exiting	0.04	0.04	0.05	0.07	0.09	0.11	0.2	0.2	0.2
	Parallel	0.06	0.06	0.08	0.11	0.13	0.13	0.14	0.15	0.14

Storm Radius (nm)	15	30
Probability	0.55	0.45

Forward Speed (knots)		8	14	20
Probabilities:	Entering	0.26	0.46	0.28
	Exiting	0.55	0.41	0.04
	Parallel	0.62	0.34	0.04

Direction of Storm Path (Degrees from Northn)	Entering		Alongshore	Exiting	
	66	21	-24	-69	-114
Probability	0.030	0.26	0.22	0.17	0.05

Frequency 4.08×10^{-3} storms/nm/year

Table 2. Gage Station Records

Gage Station	U.S. Geological Survey Gage Station Number	Location	Drainage Area (Square Miles)	Period of Record Used
Alligator Creek At Safety Harbor	02307697	0.8 Mile Southwest of Safety Habor, Pinellas County	9.0	1950-58 1961-74
Anclote River Near Elfers	02310000	3.5 Miles East of Elfers, Pasco County	72.5	1952-74
Blackwater Creek Near Knights	02302500	4.4 Miles Northwest of Knights, Hillsborough County	110.0	1952-74
Brooker Creek Near Tarpon Springs	02307359	5.0 Miles Southeast of Tarpon Springs, Pinellas County	30.0	1951-74
Hillsborough River Near Zephyrhills	02303000	6.5 Miles Southwest of Zehphyrhills, Hillsborough County	220.0	1940-74
Myakka River Near Sarasota	02298830	Sarasota, 14.0 Miles Southeast of Sarasota County	235.0	1954-74
Rocky Creek Near Sulphur Springs	02307000	7.5 Miles West of Sulphur Springs, Hillsborough County	35.0	1954-74
Seminole Lake Outlet Near Largo	02308889	5.2 Miles South of Largo, Pinellas County	14.0	1951-72
Sweetwater Creek Near Sulphur Springs	02306500	4.1 Miles Northwest of Sulphur Springs, Hillsborough County	7.4	1952-74

Table 3. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Discharge (Cubic Feet per Second) 10-Year	50-Year	100-Year	500-Year
Ditch 1 At Mouth	3.2	340	440	480	550
Ditch 2 At Mouth	2.0	200	260	280	320
Ditch 3 At Mouth	1.6	160	205	220	255
Ditch 4 At Mouth	2.3	220	285	310	355
Ditch 5 At Mouth	0.6	61	78	83	96

3.2 Hydraulic Analyses

Hydraulic analyses were performed for both tidal and riverine flooding sources in the community to provide estimates of elevations of floods of the selected recurrence intervals.

For areas subject to flooding directly from Tampa Bay and Boca Ciega Bay, the Federal Emergency Management Agency standard coastal surge model was used to simulate the coastal surge generated by any chosen storm (that is, any combination of the five storm parameters defined previously). Performing such simulations for a large number of storms, each of known total probability, permits one to establish the frequency distribution of surge height as a function of coastal location. These distributions incorporate the large scale surge behavior but do not include an analysis of the added effects associated with much finer scale wave phenomena, such as wave height, setup, or runup. As the final step in the calculations, the astronomic tide for the region is statistically combined with the computed storm surge to yield recurrence intervals of total water level (Reference 15).

This model utilizes a grid pattern approximating the geographical features of the study area and the adjoining areas. Surges were computed utilizing grids of 5 nautical miles, 1 nautical mile, and 2000 feet, depending on the resolution required.

Elevations for floods of the selected recurrence intervals on Boca Ciega Bay and Tampa Bay are shown in Table 4.

Underwater depth data and land heights for the model grid systems were obtained from National Oceanic and Atmospheric Administration nautical charts (References 16, 17, and 18) and U.S. Geological Survey topographic maps (Reference 19).

Table 4. Summary of Elevations

Flooding Source and Location	Elevation (Feet) 10-Year	50-Year	100-Year	500-Year
Boca Ciega Bay At Cross Bayou Canal	5.6	9.0	10.8	13.7
Tampa Bay At St. Petersburg-Clearwater International Airport	5.2	8.2	9.6	12.6

Elevations of the shallow flooding in areas inundated by backwater from the ditches in the city were obtained from data prepared for the Pinellas Park Water Management District by Greiner Engineering Sciences, Inc. and from the 1977 Flood Insurance Study prepared for Pinellas Park (Reference 3). In that study, water-surface elevations were computed using the E-431 step-backwater computer program (Reference 20). Cross sections were field surveyed.

Channel roughness factors (Manning's "n") used in this study were assigned on the basis of field inspection of flood plain areas and hydraulic data observed in the study area during the June 1974 flooding.

Flooding caused by backwater from the ditches is usually less than 1 foot deep. In some areas, adjacent to the ditches, backwater may pond within low-lying depression areas. Flood profiles are not applicable for shallow flooding areas and are, therefore, not shown.

This hydraulic analysis is based on the effects of unobstructed flow, and does not take into account debris which may accumulate in the ditches.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the map.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage State and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Emergency

Management Agency as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each flooding source studied in detail, the boundaries of the 100- and 500-year floods have been delineated using the flood elevations determined from topographic maps at a scale of 1:24,000, with a contour interval of 5 feet (Reference 19), and aerial photographs at a scale of 1:2,400, with a contour interval of 1 foot (Reference 21). Additional charts were consulted in order to cross-check boundaries (Reference 22).

Flood boundaries are indicated on the Flood Insurance Rate Map (Exhibit 1). On this map, the 100-year flood boundary corresponds to the boundary of the areas of special flood hazards (Zones AH, A9 and A10); and the 500-year flood boundary corresponds to the boundary of the areas of moderate flood hazards (Zone B). Zone B also corresponds to areas subject to certain types of 100-year shallow flooding. Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding; owing to limitations of the map scale, such areas are not shown. In cases where the 100- and 500-year flood boundaries are close together, only the 100-year flood boundary has been shown.

4.2 Floodways

The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment in order that the 100-year flood be carried without substantial increases in flood heights. Floodways are not applicable in riverine shallow flooding areas; therefore, none were delineated for this study.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the Federal Emergency Management Agency has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail affecting Pinellas Park.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses or water bodies having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach:

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding sources of Pinellas Park are summarized in Table 5.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is the Federal Emergency Management Agency device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHF are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective Flood Hazard Factors, the entire incorporated area of the City of Pinellas Park was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone AH: Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; base flood elevations are shown, but no Flood Hazard Factors are determined.

Zones A9 and A10: Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to Flood Hazard Factors.

Zone B: Areas between the Special Flood Hazard Areas and the limits of the 500-year

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION (FEET NGVD)[3]
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
Boca Ciega Bay							
Reach 1	0001,0003	-5.2	-1.8	2.9	050	A10	11
Tampa Bay							
Reach 1	0002,0005	-4.4	-1.4	3.0	045	A9	10
Ditch 1							
Shallow Flooding	0003	N/A	N/A	N/A	N/A	AH	12
Shallow Flooding	0003,0004	N/A	N/A	N/A	N/A	AH	13
Shallow Flooding	0004	N/A	N/A	N/A	N/A	AH	14
Ditch 1A							
Shallow Flooding	0004,0007	N/A	N/A	N/A	N/A	AH	15
Ditch 2							
Shallow Flooding	0007	N/A	N/A	N/A	N/A	AH	17
Shallow Flooding	0007	N/A	N/A	N/A	N/A	AH	18
Ditch 2A							
Shallow Flooding	0005	N/A	N/A	N/A	N/A	AH	12
Shallow Flooding	0004	N/A	N/A	N/A	N/A	AH	13
Ditch 3							
Shallow Flooding	0007	N/A	N/A	N/A	N/A	AH	19
Ditch 4							
Shallow Flooding	0006	N/A	N/A	N/A	N/A	AH	16
Shallow Flooding	0006,0007	N/A	N/A	N/A	N/A	AH	17
Ditch 5							
Shallow Flooding	0006	N/A	N/A	N/A	N/A	AH	15

[1]Flood Insurance Rate Map Panel [2]Weighted Average [3]Rounded to Nearest Foot

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF PINELLAS PARK, FL
(PINELLAS CO.)

FLOOD INSURANCE ZONE DATA

BOCA CIEGA BAY-TAMPA BAY-DITCHES 1, 1A, 2, 2A, 4 AND 5

flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding.

The flood elevation differences, Flood Hazard Factors, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community are summarized in Table 5.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for Pinellas Park is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevations. Base flood elevation lines are the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the Federal Emergency Management Agency.

6.0 OTHER STUDIES

In 1977, a Flood Insurance Study of Pinellas Park was prepared (Reference 3). In 1976, an environmental and flood hazard study of the Pinellas Park planning area was prepared for the city by Milo Smith & Associates, Inc. (Reference 23).

The water-surface elevations for riverine flooding for the ditches in this Flood Insurance Study were taken from the 1977 Flood Insurance Study prepared by the U.S. Geological Survey (Reference 3). The flood boundaries shown in this study for the ditches were redelineated and redesignated using more up-to-date topographic information (Reference 21). The water-surface elevations and the flood boundaries for the other areas of Pinellas Park are derived from coastal surge values computed for this study by the study contractor, using more up-to-date methods. The water-surface elevations computed by the study contractor are generally higher than those from the 1977 study.

Flood Insurance Studies are being prepared for the adjacent communities of Largo (Reference 24), St. Petersburg (Reference 25), and the unincorporated areas of Pinellas County (Reference 26). These studies will be in agreement with this Flood Insurance Study.

This study is authoritative for the purposes of the National Flood Insurance Program; data presented herein either supersede or are compatible with all previous determinations.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the Natural and Technological Hazards Division, Federal Emergency Management Agency, 1375 Peachtree Street, NE., Atlanta, Georgia 30309.

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9.0 REVISIONS DESCRIPTION

This section has been added to provide information regarding significant revisions made since the original Flood Insurance Study was printed. Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood hazard data located at the Engineering Department, 6051 78th Avenue North, Pinellas Park, Florida.

9.1 First Revision (Revised February 17, 1989)

a. Acknowledgments

The hydrologic and hydraulic analyses for this Revisions Description were performed by Greiner Engineering Sciences, Inc., for the Pinellas Park Water Management District. The Federal Emergency Management Agency reviewed and accepted these data for purposes of this revision.

b. Scope

This revision encompasses a restudy that reflects improvements to a portion of the stormwater drainage system for the City of Pinellas Park. The flooding associated with Ditch 1 and its tributaries was revised upstream of Haines Road. The flooding associated with Ditch 2 and its tributaries was revised upstream of Gandy Bridge Boulevard. The flooding associated with Ditch 4 and its tributaries was also revised. Additionally, corporate limits were revised.

c. Hydrologic and Hydraulic Analyses

The following information was compiled and used in computer programs for hydrologic routing: rainfall depths derived from TP-40 (Reference 27) for storm events of varying frequency; watershed information gathered from Southwest Florida Water Management District (SWFWMD) maps (Reference 28); cross-section data; and drainage structure data reflecting the channel improvements. The runoff hydrographs generated using the storm event data were routed through the improved drainage system, resulting in new peak discharges for Ditches 1, 2, and 4. The Soil Conservation Service (SCS) TR-20 computer program (Reference 29) was used for Ditch 1 upstream of CSX Transportation and for Ditch 2. Techniques presented in an SCS publication (Reference 30) were used to develop discharges for Ditch 1 downstream of CSX Transportation. The discharges at the mouth of Ditch 1 were calculated based on values from the TR-20 model at CSX Transportation. The SCS FLDRT computer program (Reference 31) was used to develop discharges for Ditch 4. The new discharges are given in Table 6, Revised Summary of Discharges. The hydraulic analyses were performed using the SCS WSP-2 computer program (Reference 32). Cross sections were field surveyed. Roughness factor (Manning's "n") values ranged from 0.013 to 0.050 for the channel and from 0.027 to 0.070 for the overbanks.

Floodplain boundaries were delineated on the SWFWMD maps (Reference 28).

TABLE 6 - REVISED SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR
DITCH 1 at mouth	3.7	1,269	1,684	1,850
DITCH 2 at mouth	1.23	285	370	430
DITCH 4 at mouth	2.95	645	865	950

d. Insurance Application

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 foot and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

The reach determinations, Flood Hazard Factors, and flood insurance zones presented in Sections 5.1, 5.2, and 5.3 of this report and Table 5, Flood Insurance Zone Data, are no longer applicable.

e. Flood Insurance Rate Map

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

f. Other Studies

This Flood Insurance Study does not agree with the Flood Insurance Study for Pinellas County, Florida (Reference 33). This study contains better information concerning the flooding associated with Ditches 1, 2, and 4.

g. References and Bibliography

27. U.S. Department of Commerce, National Weather Service, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, Washington, D.C., January 1963.

28. Southwest Florida Water Management District, Pinellas-Anclote River Basin, Pinellas Park, Scale 1:2400, Contour Interval 1 Foot: Brooksville, Florida, November 1977.

29. U.S. Department of Agriculture, Soil Conservation Service, Engineering Division, Technical Release No. 20, Computer Program for Project Formulation, Hydrology, May 1965.

30. ----------, Soil Conservation Service, National Engineering Handbook, Section 4, "Hydrology," August 1972.

31. ----------, Soil Conservation Service, Central Technical Unit, FLDRT, October 1967.

32. ----------, Soil Conservation Service, Technical Release No. 61, WSP-2 Computer Program, May 1976.

33. Federal Emergency Management Agency, Flood Insurance Study, Pinellas County, Unincorporated Areas, Florida, December 1982.

ELEVATION REFERENCE MARKS

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
1	0007	14.293	Florida State Road Department disk 49.0 feet south of centerline of State Route 694 (74th Avenue North, Park Boulevard), 141.9 feet west of centerline of 65th Street N., set in top of concrete inlet
2	0009	17.534	Pinellas County disk 68.8 feet southwest of centerline of U.S. Highway 19, 98.0 feet south-southeast of centerline of State Route 694 (74th Avenue North, Park Boulevard), 30.5 feet south of power/light pole (number 2A-3493), 1.5 feet north of back of curb, set in top of concrete post flush with ground